

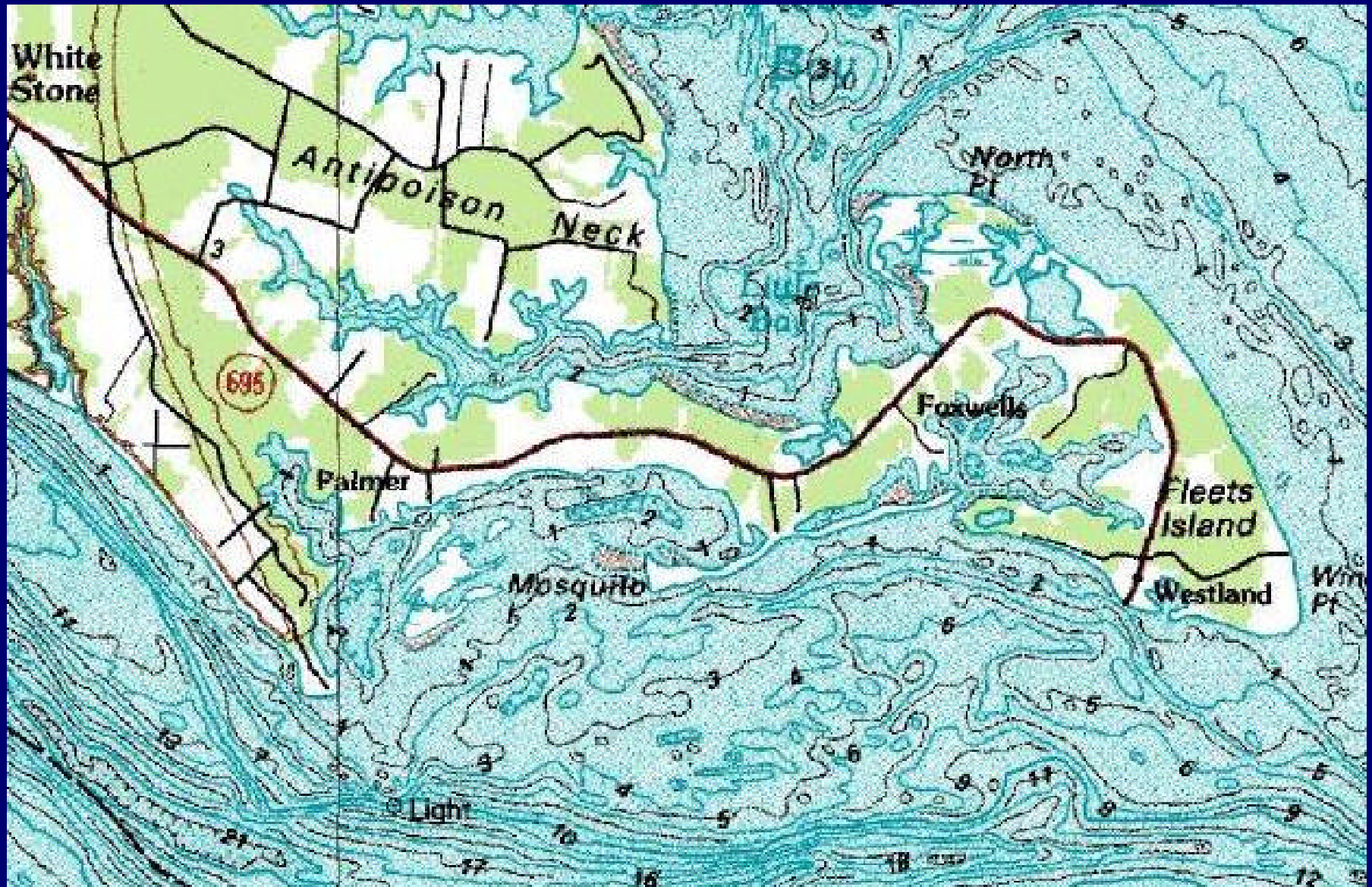
Bacteria TMDL Development for Molluscan Shellfish Waters in Oyster & Mosquito Creeks

First Public Meetings

November 14, 2008
Kilmarnock, VA



Mosquito & Oyster Creeks Map



What is a TMDL?

TMDL = Total Maximum Daily Load =
maximum amount of a pollutant that
can enter a waterbody without violating
water quality standards (WQS)



WQS = numeric or narrative limits on
pollutants that ensure the protection of
human health and of aquatic life



Why are TMDL studies necessary?

- TMDLs must be developed for water bodies that do not meet water quality standards (impaired waters).
- Impaired waters occur throughout Virginia in lakes, streams, and tidal waters.
- In Virginia, TMDLs for 210± impaired waters must be developed by 2010.
 - Of these, 25± are shellfish TMDLs under a consent order.

People involved in the Process:

- Virginia Department of Health - Division of Shellfish Sanitation
- Virginia Department of Conservation and Recreation
- Virginia Department of Environmental Quality
- Other State Agencies, Local Governments and Planning Districts
- U.S. Environmental Protection Agency and other appropriate federal agencies
- Citizens groups, educational institutions environmental groups, & local business
- **YOU!**

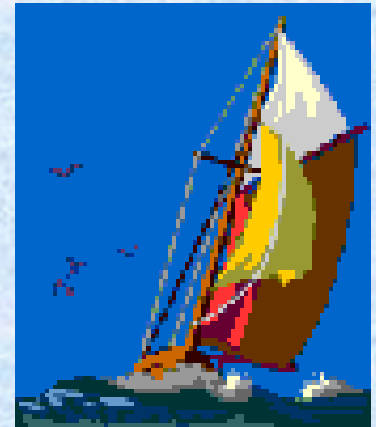


What information is used to develop a TMDL?

- VDH Sanitary Shoreline Survey
- VDH Bacteria monitoring data
- Population estimates for humans, pets, wildlife, livestock (Census, VIMS, DCR, DGIF, & the public)
- Affected waters volume
- Bacterial Source Tracking Data (BST)
- Land Use, Climate, Tide, etc.
- DEQ permit data
- DEQ spill response and remediation data

Virginia's TMDL Development Process

- Public notice for TMDL development
- TMDL study
- Public notice for Draft TMDL
- Final TMDL report
- EPA approval
- Implementation process



==> **Many opportunities for public
input and participation!**

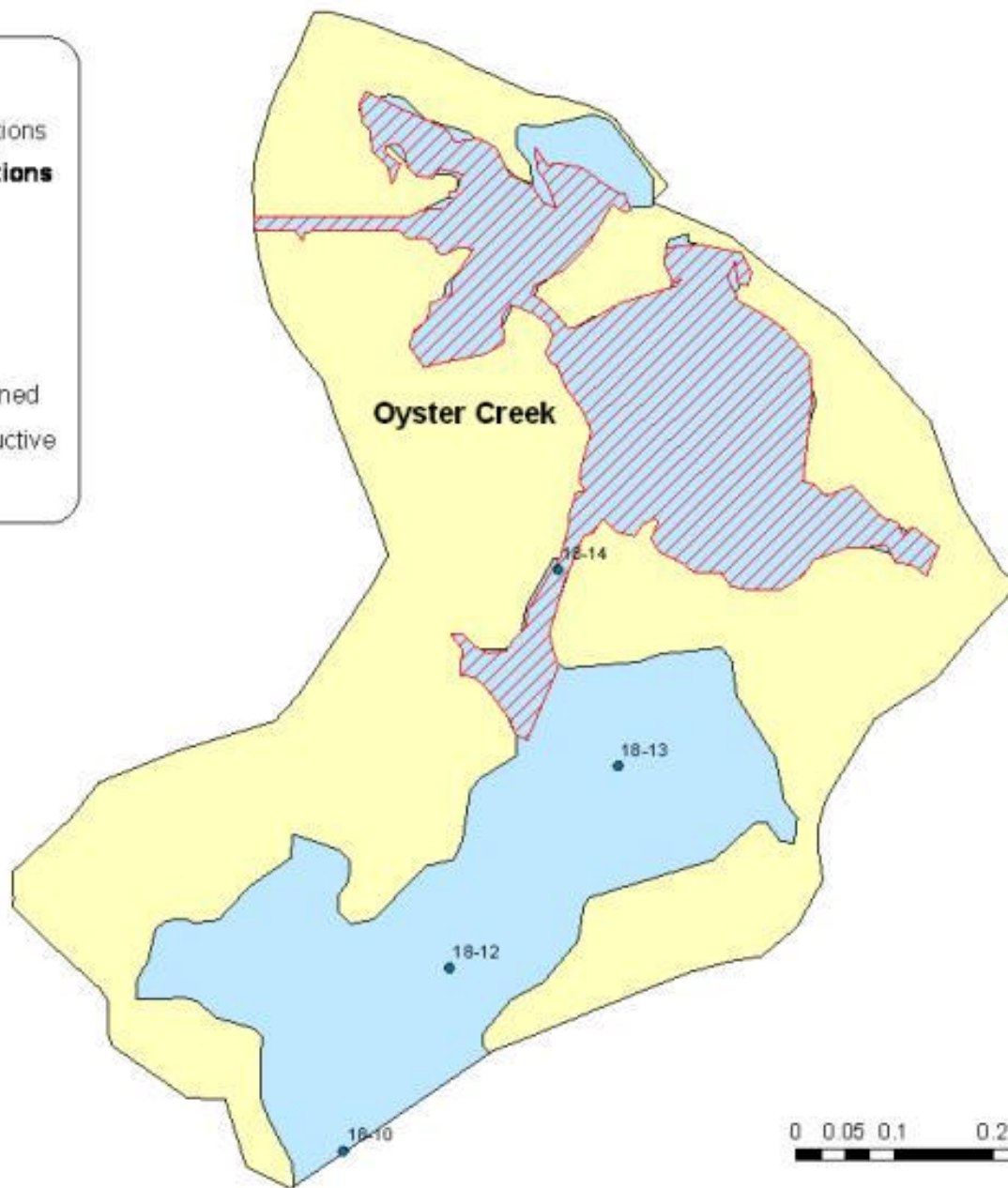
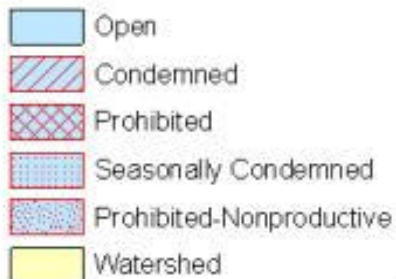
Why is a TMDL needed for the Oyster & Mosquito Creeks Watersheds?

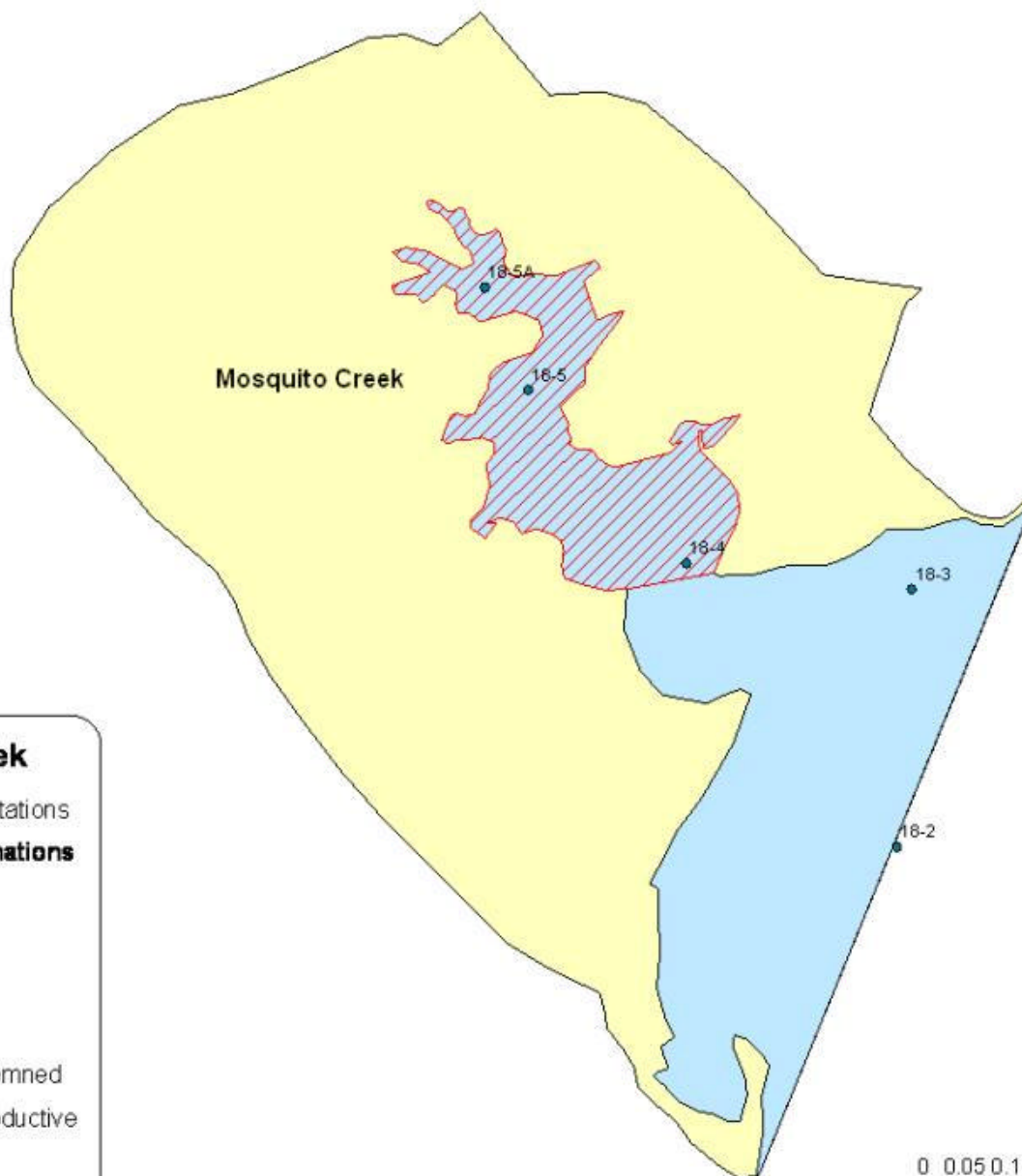
- VDH Division of Shellfish Sanitation (DSS) monitors fecal coliform levels in shellfish waters
- Applicable water quality standards
 - 30-month geometric mean not exceeding 14 MPN/100 mL
 - and a 90th percentile not exceeding 49 MPN/100 mL
- The portions of Oyster & Mosquito Creeks that currently fail these standards are:

Oyster Creek

• VDH Monitoring Stations

VDH Shellfish Condemnations











Mosquito Creek

• VDH Monitoring Stations

VDH Shellfish Condemnations

-  Open
-  Condemned
-  Prohibited
-  Seasonally Condemned
-  Prohibited-Nonproductive
-  Watershed

0 0.05 0.1 0.2 0.3 0.4 Miles

Water Quality Data Summary for Oyster & Mosquito Creeks - Growing Area 18

90th Percentile represents the more stringent reduction

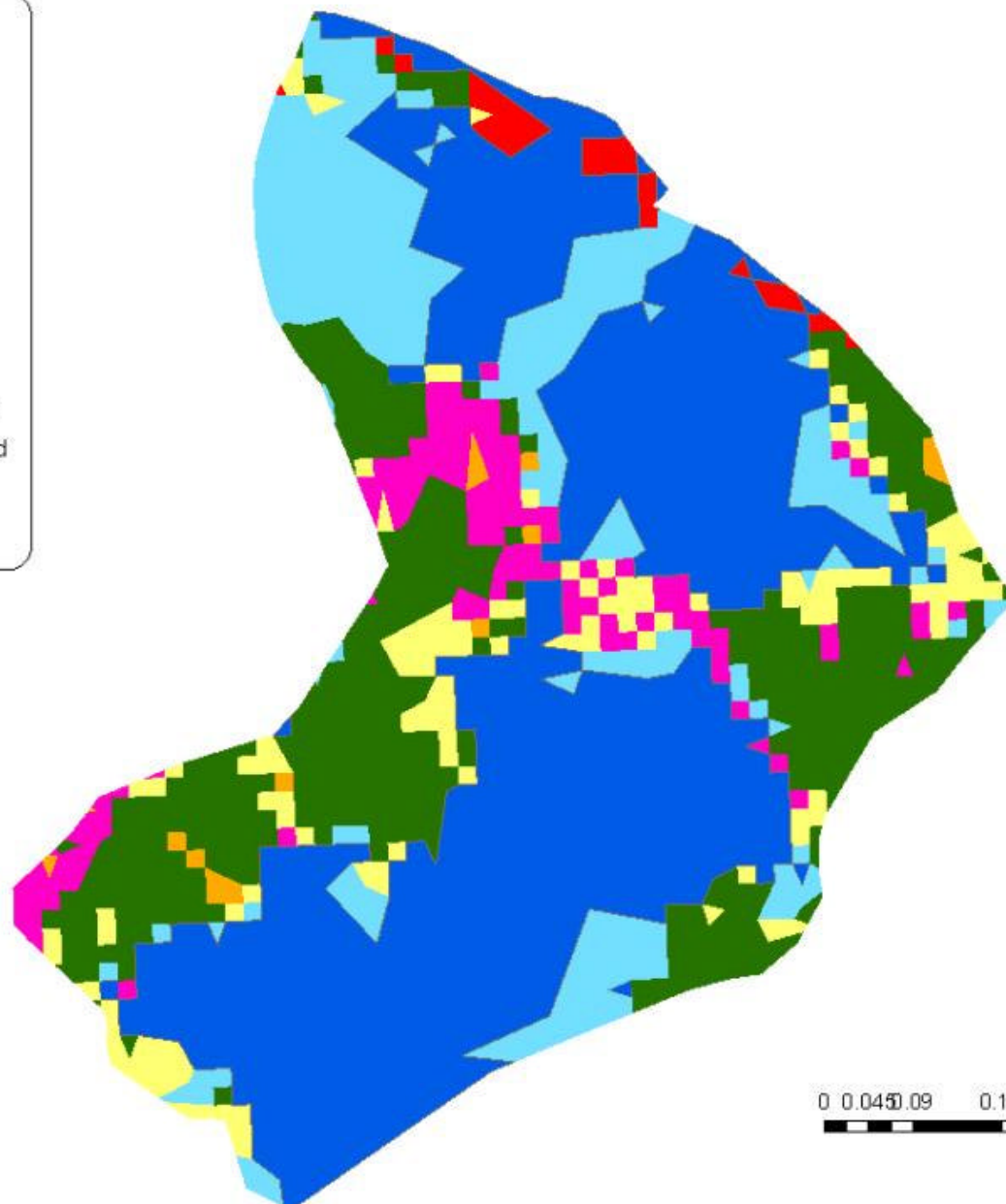
Station	Condemnation Area	Total Observations (one/Month)	Geometric Mean	Station Violates Geometric Standard: 14 MPN	90 th Percentile	Station Violates 90th Percentile Standard: 49 MPN
Mosquito Creek						
18-5A	203	110	18.58	Yes	173.91	Yes
18-5	203	260	16.53	Yes	93.97	Yes
18-4	203	259	11.33	No	80.36	Yes
Oyster Creek						
18-14	186/053	219	11.78	No	85.26	Yes

Oyster Creek

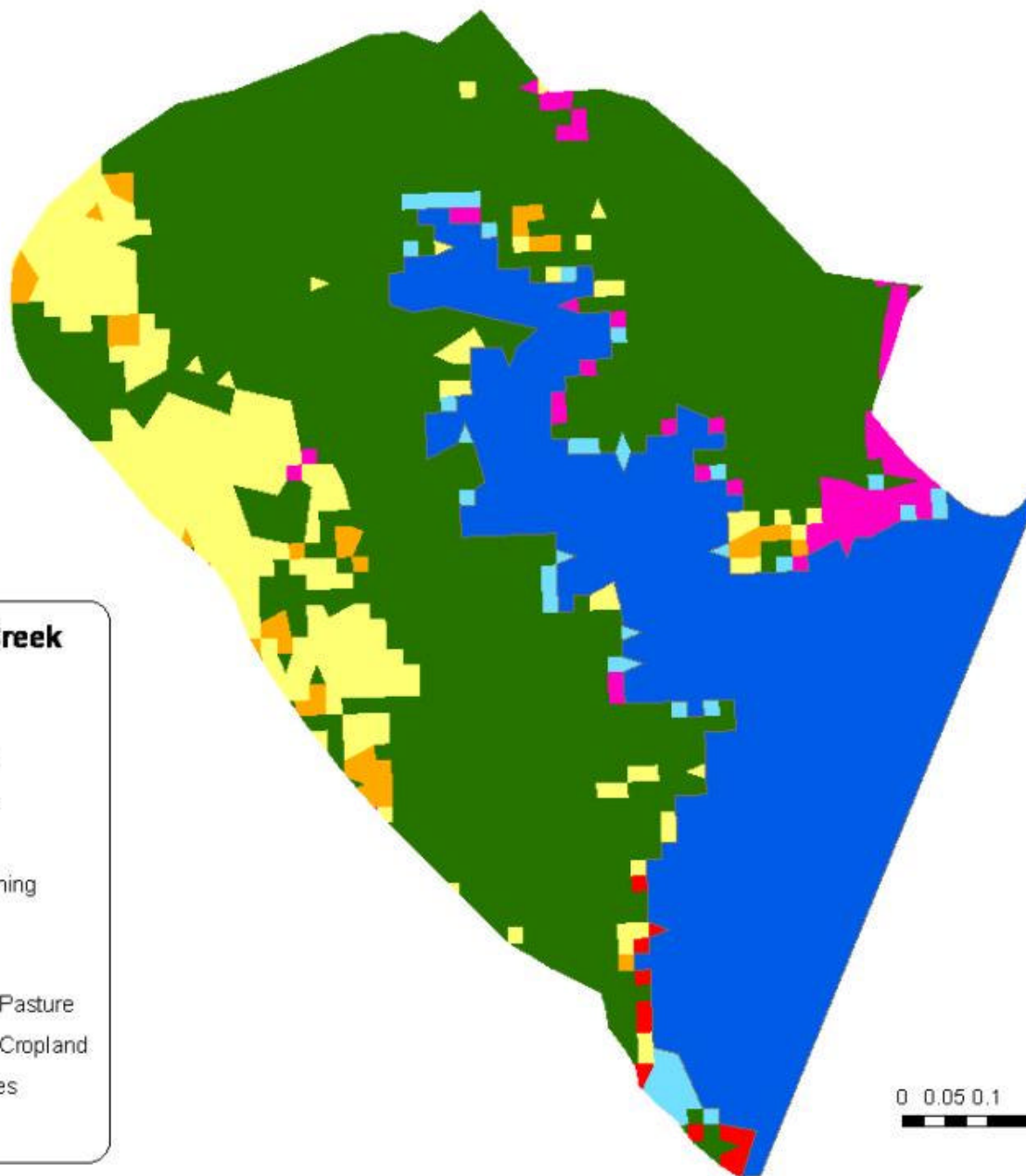
Landuse

VA NLCD

- Unclassified
- Open Water
- Urban
- Barren or Mining
- Transitional
- Forest
- Agriculture - Pasture
- Agriculture - Cropland
- Other Grasses
- Wetlands



0 0.045 0.09 0.18 0.27 0.36 Miles



Mosquito Creek

Landuse

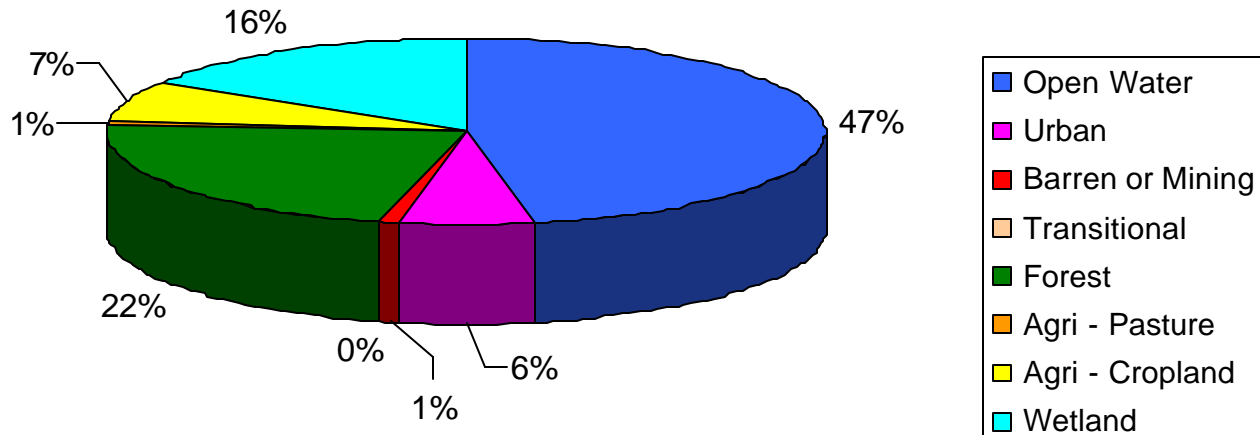
VA NLCD

-  Unclassified
-  Open Water
-  Urban
-  Barren or Mining
-  Transitional
-  Forest
-  Agriculture - Pasture
-  Agriculture - Cropland
-  Other Grasses
-  Wetlands

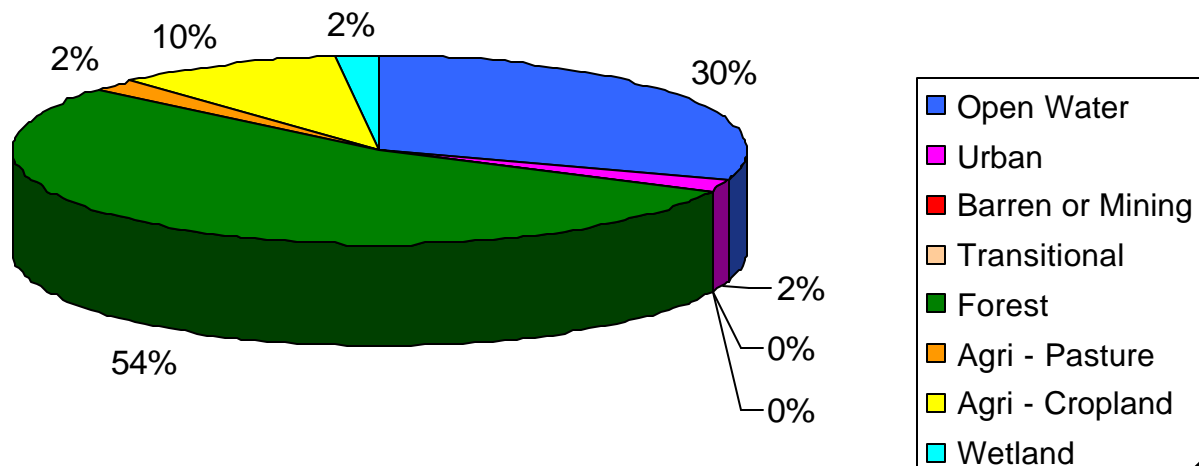
0 0.05 0.1 0.2 0.3 0.4 Miles



Oyster Creek Land Use Percentages by Type



Mosquito Creek Land Use Percentages by Type



Tidal Volumetric Model + BST TMDL Approach

- Calculate volume of impaired water
- Calculate the acceptable loading;

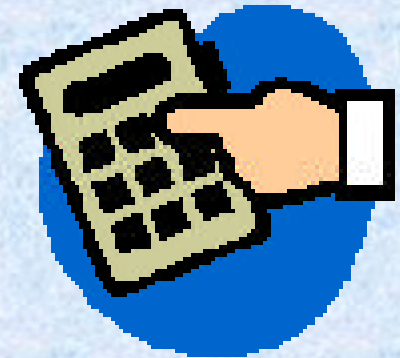
Water Quality Standard (WQS) x Volume

- Calculate actual loading;

Critical fecal count x Volume

- Source determination;

Fecal samples collected for BST are subjected to Antibiotic Resistance Analysis (ARA) and compared with known fecal samples



Use of Bacterial Source Tracking in TMDLs

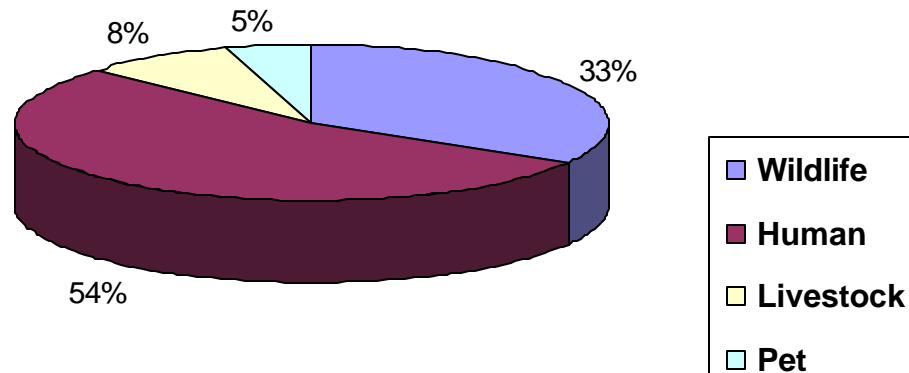
- VDH-DSS monitoring data is used to calculate critical fecal count
- Supplementary BST samples at selected stations are used to help identify bacteria sources
- Antibiotic Resistance Analysis - BST method for source load allocation into 4 categories:



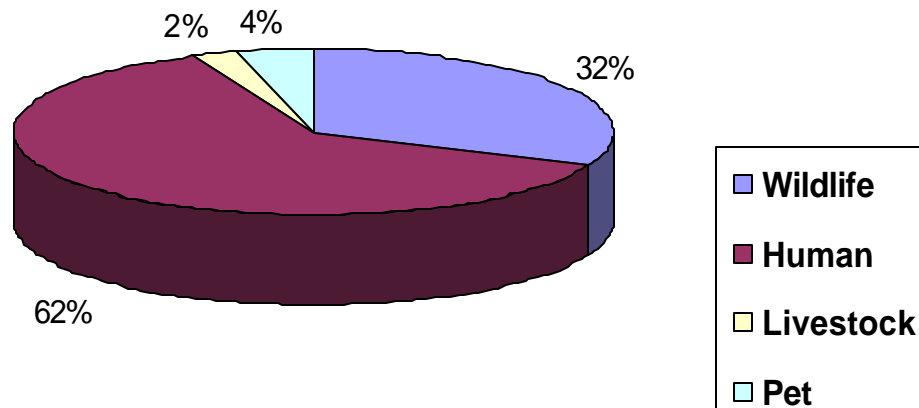
1. Human
2. Pets
3. Livestock
4. Wildlife

Weighted Oyster & Mosquito Creeks BST Sources

Oyster Creek BST Percentages
(Isolate, Concentration, and Volume Weighted)



Mosquito Creek BST Percentages
(Isolate, Concentration, and Volume Weighted)



Non-Point Source Contribution Numbers

**Domestic Animals and Septic Systems observed contributing pollution for
Oyster and Mosquito Creeks (as sited in VDH Sanitary Survey)**

Fecal Coliform Sources	Oyster & Mosquito Creek
Sheep	5
Horses	1
Septic (human)	5

Livestock and Wildlife Population Estimates for Collective Watersheds

	Cattle	Chickens	Horses	Dogs	Deer	Raccoons	Ducks	Geese
Oyster Creek	1	0	0	34	29	81	422	315
Mosquito Creek	7	2	0	66	60	105	501	373
Total for Collective Watershed	8	2	0	99	89	186	924	688

Next Steps...

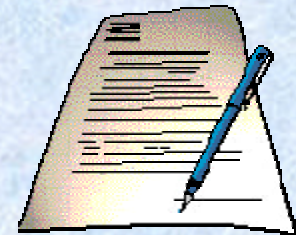
- **30 Day Public Comment Period**

- Ends December 15th, 2008
- Comments must include the name, address, and telephone number of the commenter. All comments will receive a written response and will be incorporated into the final report that will be sent to EPA.

- **TMDL Development Continues...**

- **Final Public Meetings**

- Planned for 1st week of January



- **Final 30 Day Public Comment Period**

- **Report Submitted to EPA for approval**

- **Implementation Planning** (scheduling by DCR)

Questions?? Comments??

Presentation available at:

<http://www.deq.virginia.gov/tmdl/mtgppt.html>

Please send comments & questions to:

DEQ - Piedmont Regional Office

Attn: Margaret Smigo

4949-A Cox Road

Glen Allen, VA 23060

Email: mjsmigo@deq.virginia.gov

TMDL Website: <http://www.deq.virginia.gov/tmdl>

